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"ANTRYCIDE" TREATMENT OF T. CONGOLENSE—T. VIVAX RELAPSES AND RE-INFECTIONS

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A preliminary report on the new trypanocidal drug "Antrycide" has recently been given by the original investigators (Curd & Davey, 1949). In February, 1948, we had the pleasure of offering facilities to Dr. Davey, of Imperial Chemical (Pharmaceuticals), Ltd., to carry out extended work on this drug at the Veterinary Research Laboratory, Entebbe. Arising from this work we were able to make certain independent observations concerned chiefly with treatment of relapses and re-infections following "Antrycide" treatment.

A freshly isolated strain of *Trypanosoma congolense* was obtained from untreated bovines at Mubende, Buganda Province, on February 27th, 1948, and using this strain the curative dose of "Antrycide" chloride for bovines was determined as between 1-2 mg. per kg. and that of the "Antrycide" sulphate as 0.5 mg. per kg.

Bovine No. 4876 was infected with the "Mubende" strain on 27.2.48 and after trypanosomes had been present for some days, was treated with 0.5 mg. per kg. "Antrycide" chloride on 8.3.48. It relapsed on 14.4.48 and was re-treated with 0.5 mg. per kg. "Antrycide" chloride on 20.4.48. It again relapsed on 7.5.48 and had the second re-treatment at 1 mg. per kg. on 20.5.48. This bovine suffered a third relapse on 16.6.48 but was finally cured at the third retreatment with 1 gramme "Antrycide" sulphate on 19.7.48. Blood was sub-inoculated into bovine No. 1413 on 19.5.48 and an infection of *T. congolense* was established. Treatment with 0.5 mg. per kg. "Antrycide" chloride on 7.6.48 caused no obvious decrease in the number of trypanosomes circulating in the blood stream and this bovine remained infected until death on 16.6.48.

From this preliminary experiment there was evidence that by the use of sub-curative doses, a strain of *T. congolense* resistant to curative doses might develop and that this resistant strain could be transferred to other bovines. The following examples show that this feature may become manifest when "Antrycide" is used at curative or prophylactic dosages.

Bovine No. 5022, with no previous history of trypanosome infection, was dosed with 5 mg. per kg. "Antrycide" sulphate on May 21st, 1948, and was challenged on August 18th, 1948, with the "Mubende" strain of *T. congolense*. Infection was established in eight days, and after an interval of a further ten days during which trypanosomes were present daily, the animal was treated on September 4th with 5 mg. per kg. "Antrycide" sulphate. Blood smears became negative 72 hours after treatment and remained negative until the animal died of cachexia on January 22, 1949. Blood drawn on the day before death was sub-inoculated into bovine No. 244, which showed *T. congolense* infection 23 days later. It was therefore evident that in bovine No. 5022 a resistant strain was developing which produced a "cryptic" but nevertheless fatal infection.

Bovine No. 20, with no previous history of trypanosome infection, was dosed with 2 grammes "Antrycide" chloride on March 11th, 1948, and after an interval of six months, during which it was kept free from all risk of trypanosome infections, was challenged on September 6th with "field" strains of *T. congolense* and *T. brucei*. A *T. congolense* infection was established 37 days later and was treated on November 8th, 1948, with "Antrycide" sulphate at 3 mg. per kg. Blood smears were negative 48 hours later but became positive to *T. congolense* on December 25th. Here again a strain of *T. congolense* was developing, which showed an early resistance to doses of "Antrycide" within the range of those likely to be used for treatment.

Bovine No. 16, treated with 2 grammes "Antrycide" sulphate on July 20th, 1948, was after two days exposed with nine other bovines in a *Glossina pallidipes* area. On February 16th, 1949, it was the only survivor and showed a mixed *T. congolense–T. vivax–T. brucei* infection. Blood collected on that day was sub-inoculated into two clean calves Nos. 250 and 284. Both calves showed a *T. congolense* infection on February 21st, and calf No. 250, left untreated, died on March 21st. Calf No. 284 was treated with 5 mg. per kg. "Antrycide" sulphate on March 3rd and the blood became negative within 24 hours. It relapsed on April 19th. It is evident therefore that the trypanosomes which developed in bovine 16 by tsetse infection under prophylactic "Antrycide" treatment, showed a measurable degree of drug-resistance.

On February 16th, 1949, six mice were infected with citrated blood ex bovine No. 16 and six were infected with our "Busimbi" strain of *T. congolense*. All the mice weighed approximately 20 grammes and all showed *T. congolense* on 21.2.49 and were treated on 26.2.49 with "Antrycide" sulphate at 10 mg. per kg. The six mice infected with the "Busimbi" strain showed no trypanosomes in the circulating blood 24 hours after treatment and were still negative eight weeks after treatment. The six mice infected ex bovine No. 16 were not free of trypanosomes until the fourth day after treatment, and two relapses occurred on 19.4.49, 52 days after treatment. This afforded further proof of the drug-resistant nature of the trypanosomes present in bovine No. 16.

Evidence of development of drug-fastness in *Trypanosoma vivax* infections is more difficult to collect since in Uganda infections are notoriously difficult to diagnose by blood examination. That this difficulty of diagnosis is of practical importance in prophylactic experiments is shown by the case of bovine No. 19, which was dosed with 2 grammes "Antrycide" sulphate on July 20th, 1948, and after two days was exposed in a *Glossina pallidipes* fly-belt. When examined ten weeks later, on October 1st and 2nd, the animal was obviously "fly-struck" and in a weak

condition but no trypanosomes could be found after repeated examination of wet smears on both days and ten thick smears, taken at the same time, were also negative. 10 c.c. citrated blood was drawn on October 2nd and on sub-inoculation at the laboratory into a healthy bovine, No. 5700, a fulminating *T. vivax* infection developed and death occurred in 35 days. Bovine No. 19 died on October 4th but smears were still negative.

Bovine L.6 was treated with 1.5 grammes " Antrycide " chloride on July 23rd, 1948, and was continually exposed in a *G. morsitans* " fly-belt " from July 29th onwards. Scanty *T. vivax* were found in blood smears at brief intervals from the end of the fourth month of exposure. On January 5th, 1949, this animal was re-treated with 2.5 grammes " Antrycide " sulphate and blood smears remained negative until June. 200 c.c. of citrated blood drawn from this animal on February 10th was sub-inoculated into a clean animal and a mixed *T. vivax–T. brucei* infection was established after an incubation period of 24 days. One must assume that the *T. vivax* present in bovine L.6 on February 10th were drug resistant.

When it was evident that relapse strains showed resistance to further treatment with " Antrycide " an attempt was made to treat such relapses with dimidium bromide (Phenanthridinium 1553).

Bovine No. 5486 was infected with a field strain of *T. congolense* on February 27th, 1948, and was treated on March 8th with " Antrycide " chloride at 1 mg. per kg. This bovine relapsed 98 days later and on July 19th, 1948, it was treated with 1 mg. per kg. dimidium bromide. Trypanosomes disappeared from the blood stream 48 hours later and were present again in blood smears only on August 21st and September 8th. Two sub-inoculations were made from this bovine during the period when blood smears remained negative; on October 20th, 40 c.c. of citrated blood was sub-inoculated into bovine No. 5736 and a *T. congolense* infection was established and again on December 3rd infection was established in bovine No. 104 by a similar sub-inoculation. Bovine No. 5486 remained in good condition and was sold for slaughter in December, 1948. The circulation trypanosomes, however, had developed some resistance to " Antrycide " since bovine No. 5736, infected on October 20th and showing *T. congolense* in blood smears on November 3rd, when treated with 3 mg. per kg. " Antrycide " sulphate on November 12th relapsed on January 12th, 1949.

Bovine No. 5610 was sub-inoculated from bovine No. 4876 on 16.6.48 after the second relapse and third treatment with " Antrycide " (see above). *T. congolense* were present on 22.6.48 and when treated with dimidium bromide on 2.7.48 it relapsed on 22.7.48. After re-treatment with dimidium bromide on 27.7.48, the blood became negative on 1.8.48 and blood smears remained negative until death of the bovine on 29.8.48. Trypanosomes were still present since blood sub-inoculated into bovine 5611 on 25.8.48 established an infection.

The effect of treating with dimidium bromide strains of *T. congolense* after they have been in contact with " Antrycide " is further illustrated by the case records of five bovines given in Table I.

The history of four animals given in Table II shows a resistance developing both to " Antrycide " and dimidium bromide.

Failure to cure relapsed strains of *T. congolense* with " Antrycide " sulphate or with dimidium bromide may not be serious if doses of " Antrycide " salts much in excess of 5 mg. per kg. can be used with safety.

Work at Entebbe supports the view that doses up to 15 mg. per kg. of " Antrycide " chloride can be given to cattle in good condition without causing any obvious clinical toxic symptoms. Under certain circumstances, however, symptoms developed after the sulphate salt was used and the drug cannot be regarded as entirely non-toxic.

The first suspicion that toxicity may be a sequel of " Antrycide " treatment, arose in March, 1948, when bovine No. 12, after treatment with 2 grammes of " Antrycide " sulphate, died under peculiar circumstances. Later, somewhat similar systems were seen in three bovines (Nos. 69, 1413 and 5611). Some preliminary work, therefore, was done to determine the toxicity of " Antrycide " sulphate for mice and a solution diluted so that 1 c.c. contained 1 mg. was used in these experiments. The results of dosage of 76 healthy mice are given in Table III.

TABLE I

Results of treating 5 bovines with dimidium bromide when *T. congolense* infection was established 6 months after treatment with "Antrycide."

Bovine No.	Original infection	Curative treatment	Challenged	Result	Second treatment	Relapse *T. congolense*
5075	Infected with *T. congolense* 27.2.48	2 mg. per kg. " Antrycide " chloride 6.3.48	Mixed infection *T. congolense*, *T. brucei*, Nsongezi strain, 6.9.48	*T. congolense* scanty during September. All heavily positive by 6.10.48	Dimidium bromide 1 mg. per kg. 14.10.48	1.11.48
5076						1.11.48
5254						12.11.48
5600						1.11.48
5604						9.11.48

TABLE II

Results showing failure to cure *T. congolense* infections following "Antrycide" treatment by curative doses of "Antrycide" sulphate and dimidium bromide.

Bovine No.	Prophylactic dosage	Challenged 18.8.48 *T. congolense*	Treatment	Relapse	Re-treatment	Result
5025	5 mg. per kg. " Antrycide " sulphate, 21.5.48	All positive by 27.8.48	1 mg. per kg. " Antrycide " sulphate, 4.9.48	All positive *T. congolense*, by 2.10.48	1 mg. per kg. dimidium bromide, 5.10.48	Relapse, 3.11.48
4931						Cured
5085						Relapse, 15.11.48
85						Relapse, 22.11.48

Table III

Results of Dosage of 76 Healthy Mice with "Antrycide" Sulphate

Dosage in c.c. ...	...	0·2	0·3	0·4	0·5	0·6
Dosage mg. per kg.	...	10	15	20	25	30
No. of mice used	...	18	12	22	14	10
No. died ...	...	0	2	9	5	10
Per cent. mortality	...	0	16	41	36	100

All mice, even at dosage of 0.2 c.c., were affected by the drug. Those mice which recovered showed a brief period of restlessness and accelerated breathing but were normal again in from 30 to 60 minutes after injection. In the mice which died, death was preceded by a short period of excitement, the mice moved uneasily around the cage, made a few agitated leaps in the air, and then collapsed and died within 10 to 15 minutes after injection. It was concluded that doses in excess of 10 mg. per kg. were toxic for mice.

Toxicity trials were then carried out on eleven head of cattle at dosage varying from 11 mg. to 36 mg. per kg. and details are given in Table IV.

Table IV

Bovine No.	Quantity of "A" sulphate in grammes	Dosage in mg. per kg.	Result
244	2·25	36·0	Died 6th day
241	1·3	32·5	„ 2 hours
5,623	2·4	23·5	„ 12th day
258	1·0	20·0	„ 4th „
20	2·5	19·0	„ 6th hour
188	2·4	19·0	„ 6th day
11	2·25	17·7	„ 6th „
257	1·0	17·0	„ 12th „
32	1·25	16·5	Recovered
16	2·5	15·0	Died 19th day
26	1·0	11·0	„ 24 hours

All the animals, except bovine No. 188, were suffering from *T. congolense* infections, and in most cases the trypanosomes were showing signs of drug-resistance. The physical condition of the animals varied from poor to good.

The symptoms of toxicity were very characteristic and developed 10 to 30 minutes after administration of the drug. The earliest and most characteristic signs were an intermittent twitching or trembling of the labial and nasal muscles, a chewing movement of the lower jaw with increased salivation and grinding of the teeth. At the same time the animal became restless and there was slight incoordination with increased skin sensitivity. The whole head occasionally appears to tremble, and the triceps of the shoulders and biceps on the flanks also showed intermittent twitching. The respirations and heart beats were accelerated. The animal may collapse and die within a few hours or muscular twitching and restlessness may cease and the animal appear to recover. After 48 hours, however, some showed profuse bloody diarrhoea and loss of condition and death occurred six to 20 days later.

On *post-mortem* examination, when death occurred soon after dosage, there was marked inflammation of the abomasum, small intestines and rectum with enlargement of the gall bladder, haemorrhagic inflammation of the pancreas and acute inflammation of the kidneys. In more chronic cases there was ulceration of the abomasum and marked thickening of the mucosae of the duodenum and caecum.

In summarising these results it is evident that a measureable degree of drug-resistance may occur on first relapse or re-infection after "Antrycide" treatment. Before the drug can be used prophylactically on a wide scale, it is necessary to know how quickly resistance will develop under field conditions, particularly in tsetse belts where repeated re-infections are likely to occur, necessitating repeated re-treatments. The case of L.6 does not promise well for re-treatments of *T. vivax* infections under these conditions.

Latent infections in the field may result in the transmission of resistant strains by tsetse and will undoubtedly render difficult any estimation of the true prophylactic and curative effects of "Antrycide."

The fact that relapsed strains following "Antrycide" treatment are resistant to dimidium bromide is disappointing and until an alternate curative drug is available the development of resistant strains must be avoided.

Increasing the dosage of "Antrycide" sulphate has only a limited value in the prevention and cure of drug-resistant strains, owing to the possibility of grave toxic symptoms arising at dosage levels above 10 mg. per kg. It remains to be shown how the judicious use of a mixture of "Antrycide" sulphate and chloride salts may be successful in overcoming these dangers.

It is a pleasure to record the able assistance of Mr. S. G. Laws, Laboratory Technician, and of our two African Laboratory Assistants, Messrs. L. S. Mukasa and C. F. Kiwanuka, who together, during our work on "Antrycide," have examined thousands of blood smears. My sincere thanks are due to Dr. D. G. Davey, Imperial Chemical (Pharmaceuticals), Ltd., for his generous supplies of "Antrycide" and to the Director of Veterinary Services, Uganda, for permission to publish this article.

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TREATMENT OF T. SIMIAE INFECTIONS WITH "ANTRYCIDE"

By

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Trypanosoma simiae infections in domestic pigs produce a fulminating rapidly fatal disease against which treatment with dimidium bromide (Phenanthridinium 1553) has given only meagre results (Wilson, 1948). The following successful treatments with 4-amino-6-(2′-amino-6′-methyl-pyrimidyl-4′-amino) quinaldine-1:1′-dimetho sulphate ("Antrycide") are therefore of considerable interest.

Two pigs, exposed in a *Glossina fuscipleuris* fly-belt at Mbarara, approximately 250 miles from the Veterinary Research Laboratory, Entebbe, became infected with *T. simiae* on May 8th, 1948. Before death on May 10th, blood was drawn in citrate and sub-inoculated subcutaneously into a clean pig and a sheep, about 10 c.c. of blood being used in each case. The pig and sheep were then dispatched to the laboratory, Entebbe, where they arrived on May 13th, the pig arriving in a moribund condition and dying within a few hours, but the sheep (Lab. No. 3085) arrived in good health and showed *T. simiae* in blood smears intermittently from the date of arrival until death on July 1st, 1948.

Three pigs infected by subcutaneous sub-inoculation of whole blood from sheep No. 3085 were treated with "Antrycide" sulphate at doses of 5, 4 and 3 mg. per kg. bodyweight and all were discharged cured six months later. Details of the treament of these three pigs are given in Table 1.

TABLE I

DETAILS OF TREATMENT OF THREE PIGS INFECTED WITH *T. simiae* EX SHEEP No. 3085

Lab. No.	Date and rate of infection	*T. simiae* positive in blood smears	Date of treatment with "Antrycide" sulphate	Rate of dosage in mgm. per kilo.
2973	15.5.48 (2 c.c. blood)	19.5.48	20.5.48	5
3100	28.6.48 (1·5 c.c. blood)	3.7.48	3.7.48	4
3101	28.6.48 (1·5 c.c. blood)	3.7.48	3.7.48	3

Since experience had shown that infections of *T. simiae*, if left untreated, are rapidly fatal, all the pigs were treated with "Antrycide" within a few hours after blood smears showed that trypanosomes were present. In all these pigs, trypanosomes were still present on the 24th hour but had disappeared on the 48th hour after treatment. Recovery in every case was uneventful.

The case of one pig unsuccessfully treated with "Antrycide" chloride at 2 mg. per kg. with the subsequent development of drug-resistance is also recorded.

Sheep No. 3090 was infected on May 25th, 1948, by intravenous sub-inoculation of whole blood from sheep No. 3085 and blood smears were positive to *T. simiae* on June 1st. On June 10th, pigs Nos. 3098 and 3099 were infected by the subcutaneous sub-inoculation of 1 c.c. whole blood ex sheep No. 3090. Pig 3099 showed *T. simiae* in blood smears on June 18th and, left untreated, died on June 21st. Pig 3098 was positive to *T. simiae* on June 17th and when treated with 2 mg. per kg. of the insoluble chloride salt of "Antrycide" on June 20th there was no apparent diminution in the number of trypanosomes circulating in the blood stream. A further treatment on June 29th with 5 mg. per kg. of the quick-acting sulphate salt of "Antrycide" again produced little obvious effect on the trypanosomes and after treatment with 2 mg. per kg. dimidium bromide on July 3rd, the pig died on July 4th with *T. simiae* numerous in the blood stream.

On July 3rd, before treatment with dimidium bromide, 1 c.c. citrated blood was drawn from pig No. 3098 and inoculated subcutaneously into pig No. 3102. This pig showed very scanty trypanosomes in blood smears on the 7th (only one trypanosome being found in a blood smear), was definitely positive on the 8th, and was treated with 5 mg. per kg. of the "Antrycide" sulphate salt on July 9th. Trypanosomes, however, remained very numerous in blood smears until the death of the pig on July 12th.

The prophylactic value of "Antrycide" was also demonstrated in the following experiment. Three young pigs were dosed with "Antrycide" chloride on October 15th, 1948, at the rate of 1, 1.5 and 2 grammes, respectively. The average weight of these pigs was estimated at 80 lb. but there was no apparent toxic effect at this high dosage. On February 21st, 1949, approximately 18 weeks after receiving treatment, these pigs were exposed in the *G. fuscipleuris* fly-belt at Mbarara in the same area in which the original two pigs were infected. Using only "fly-boys" in this area very few tsetse can be detected but on the introduction of the pigs, *G. fuscipleuris* were attracted immediately and the pigs were heavily infested with these tsetse. Although on previous occasions no pigs have lived in these areas for more than a few weeks, the three treated pigs were still healthy on April 8th, 1949, seven weeks after exposure to tsetse and 25 weeks after receiving "Antrycide" treatment.

Strains of *T. simiae* are usually difficult to obtain and I am therefore greatly indebted to Mr. J. Collins, Mbarara, for obtaining the two infected pigs and for the care and management of the three treated pigs on his estate. My thanks are also due to Dr. D. G. Davey, of Imperial Chemical (Pharmaceuticals), Ltd., for supplying us with "Antrycide," to Mr. C. D. Hopkins, Veterinary Officer, Mbarara, and Mr. S. G. Laws for their assistance.

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Lymnaea stagnalis as an Intermediate Host of *Fasciola hepatica*

Mr. S. B. KENDALL, B.SC., M.R.C.V.S., of the Veterinary Laboratory of the Ministry of Agriculture and Fisheries, makes the following contribution to the issue of *Nature* of June 4th:—

The possibility of ritish species of *Lymnæa*, other than *L. truncatula*, acting as vectors of *Fasciola hepatica* has remained a moot point since Thomas[1], in 1883, observed the miracidia to penetrate young specimens of *L. pereger*. The observation of Nöller and Sprehn[2], in 1924, added to the uncertainty, when by dissection of a young specimen of *L. stagnalis* they actually secured cercariae that were sufficiently far developed to show the lateral glands. As a result of experiments recently carried out at Weybridge, it can now be stated with certainty that *F. hepatica* is capable of completing its development in *L. stagnalis* with the ultimate emergence of cercariae, which encyst and are capable of producing fluke infestation in mammals.

The snails used in these experiments were freshly hatched second-generation laboratory reared specimens, maintained under conditions that would exclude all possibility of unwanted infection, or the ingress of any other species of snail. They were exposed to massive infestation by the miracidia of *F. hepatica*, freshly hatched from laboratory incubated eggs, the technique of snail infection being the same as that employed at the Laboratory for the infection of *L. truncatula*.

Examination of 101 of the experimental snails showed that 13 had become infected. Ten of these 13 were dissected before the developmental cycle of the fluke had been completed, two died soon after commencing to shed cercariae; but from the third, 99 perfect cercariae emerged, including 86 which left the snail within a 24-hour period, 113 days after the date of infection. Four of these cercariae were pipetted into the mouth of a rabbit, and in six weeks' time one half-grown specimen of *F. hepatica* was recovered from the bile ducts.

Attempts to infect adult specimens of *L. stagnalis* have so far failed, and it is interesting to note that the report of Nöller and Sprehn[2] of partial success with that species, and the report of Thomas[1] of partial success with *L. pereger*, also referred to young specimens. It appears, therefore, that immature specimens are more susceptible than are adults.

Although of biological interest, this observation may have little significance from the veterinary point of view on account of the definitely aquatic habit of *L. stagnalis*, which appears to be confined to permanent water. It shows the possibility, however, of the maintenance of liver-fluke infestation in environments from which *L. truncatula* is absent, and suggests that immature specimens of yet other species of *Lymnæa* may also serve as vectors. The investigation of these possibilities is proceeding at Weybridge, and partial development of the fluke in *L. pereger* and *L. palustris* has already been observed.

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STUDIES IN BLACK DISEASE

II.—The Value of Cl. oedematiens Toxoid and Anaculture together with Carbon Tetrachloride Therapy in the Control of the Disease

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The existence of black disease in this country having been established by Jamieson, Thompson and Brotherston (1948) and later shown to be widespread in Caithness, (Jamieson & Thompson, 1946-48), and subsequently recognised in Devon, Shropshire and North England (Thomson & Ross, 1948), measures of control were started in the seasons 1947-48, 1948-49.

The control of black disease presents some difficulty on account of the dual factors associated with its aetiology. It is important to remember that for effective control of the disease an artificial immunity to the toxins of *Cl. oedematiens* must be established and at the same time measures adopted for combating the liver fluke. Turner (1936) supports this view in his statement that " he would be the last to suggest that vaccination should be the only method adopted." Rose (1936) in the same discussion stated that methodical treatment against liver fluke reduced the incidence of black disease from 10 to 4 per cent. Wardle (1936) affirms that vaccination, combined with liver fluke control either by snail eradication or by fluke destruction to a degree to prevent acute fascioliasis, is essential in the control of the disease. On the other hand, Parker (1948), in a controlled experiment, showed that the injection of antiserum prevented further deaths in a flock in which a high incidence of a disease, said to be black disease, had existed. The validity of this observation is handicapped by the absence of histological examinations supporting the diagnosis. It is, however, exceedingly doubtful, from the existing knowledge of the pathogenesis of the disease, if anything other than a temporary reduction of incidence can arise by the use of antiserum. In this connection, the epizootiology of the disease, in our experience, suggests that extended experimentation is necessary throughout the seasonal incidence of the disease in order to obtain critical results. The sharp cessation of outbreaks of the disease on certain farms, for no obvious reason, while neighbouring farms continue to encounter losses, is a characteristic feature of the disease. In these instances one can only postulate that the incidence follows closely upon the invasion of young liver flukes. For these reasons the field experiments to be described were aimed at the ultimate control of the disease and embraced systematic treatments of the individual animals with carbon tetrachloride, and vaccination with products prepared from strains of *Cl. oedematiens* isolated from sheep dead of black disease.

The Selection of a suitable Immunising Agent

Three antigens were prepared from " black disease " strains of *Cl. oedematiens*; (1) a toxoid; (2) an alum precipitated toxoid and (3) a formalinised whole culture (anaculture). A preliminary experiment was carried out at the Wellcome Veterinary Research Station, Frant, in order to ascertain the effect of these antigens at dosage levels of 2 c.c. and 5 c.c. Forty-two sheep were divided into seven groups of six sheep each. Two groups were injected with 2 c.c. and 5 c.c. of each product respectively, and one group was left unvaccinated. A second injection of the immunising agents was given 28 days later. Serum samples were collected from each animal at 0, 10, 28 and 38 days and these were titrated for the presence of *Cl. oedematiens* antitoxin.

Concurrently with this experiment, groups of sheep on black disease farms in Caithness were similarly injected.

The results of the Frant experiment are tabulated below.

Table I

The Antibody Response in Sheep to Toxoid, Alum Precipitated Toxoid, and Anaculture

Product	Sheep	Days 0	10	28	38
		u./c.c.	u./c.c.	u./c.c.	u./c.c.
Toxoid 5 c.c. dose	1	N	<1/10	<1/10	<1/10
	2	N			
	3	N			
	4	N			
	5	1/10			
	6	N			
2 c.c. dose	1	N	<1/10	<1/10	<1/10
	2				
	3				
	4				
	5				
	6				
Anaculture 5 c.c. dose	1	N	<1/10	<1/10	<1/10
	2	<1/10	1/10		<1/10
	3	<1/10			1/5
	4	N	<1/10		<1/10
	5	N			1/10
	6	N			1/5
2 c.c. dose	1	N	<1/10	<1/10	<1/10
	2				1/10
	3				1/10
	4	<1/10			
	5	N			1/10
	6	N			
Alum PPT toxoid 5 c.c. dose	1	<1/10	<1/10	<1/10	<1/10
	2		1/5		1/5
	3		<1/10		1/5
	4				2
	5	N			1
	6			1/10	1/5
2 c.c. dose	1	N	<1/10	<1/10	2
	2				1/5
	3				<1/10
	4				1/5
	5				1/5
	6				1/5
Unvaccinated	1	1/10	<1/10	<1/10	<1/10
	2				
	3	N			
	4				
	5	<1/10			
	6	N			

u./c.c. = units per c.c.
N = nil.

From the above results it would appear that the response to toxoid was low at either level of dosage. With anaculture the balance was slightly in favour of the 5 c.c. dosage level. Alum precipitated toxoid appeared to be equally

effective at either dose level and yielded the best antigenic response. In spite of the latter finding, however, the use of a product containing alum was not thought advisable in an area prone to anaerobic infections without further experimentation and without field evidence of the comparative value of toxoid and anaculture in the control of naturally occurring disease.

Complete results of the Caithness experiments are not available because of field difficulties encountered at this stage, but sufficient sera were examined to enable the opinion to be formed that sheep on black disease farms, possessing some degree of basal immunity, respond much more favourably than do sheep on non-infected pastures. The better response was not evident when the antigen was plain toxoid, but with anaculture and alum precipitated toxoid at either dose level there was evidence of a higher response. This point is of significance in view of the superiority of anaculture over toxoid in the field experiments to be described.

Field Experiment

Eighteen farms known to have experienced a high incidence of the disease were selected for comparative trials with toxoid and anaculture and with complementary liver fluke therapy. The total sheep population of 4,720 was divided at random on the individual farms into three approximately equal groups with the exception of farms 12 and 7, where the shortage of labour and the difficulty of distinguishing more than two groups prevented this procedure. The sheep were marked with coloured "buist marking paint," which is well known to survive the rigours of northern winters.

The experiment commenced in August, 1947, and terminated in March, 1948. From August until February all the experimental animals were dosed monthly with 2 c.c. carbon tetrachloride with the exception of the month during tupping. The dosage of the toxoid and anaculture was 2 c.c. repeated at 14-days interval. In all, 3,063 sheep were vaccinated and 1,657 were left as controls. It was not possible, owing to local objections, to leave the controls undosed with carbon tetrachloride. It was thought, however, that this would enhance the value of the bacteriological aspect of the experiment and subject the immunising agents to the conditions under which they would operate in normal field practice. A point behind the shoulder was chosen as the site of injection. Following vaccination the sheep were inspected frequently, and apart from a transient lameness of two or three hours' duration no sequelae were observed. It is interesting to note that this lameness was observed only in the anaculture groups. All sheep which died during the course of the experiment were examined *post mortem*. Evidence of black disease was confirmed by histological and bacteriological examinations. During the experimental period there was no alteration in management or husbandry on any of the farms, and vaccinated and unvaccinated animals intermingled freely on the pastures. The findings of this experiment are shown in Table II.

The experiment was unfortunately initiated in a year which was unusual for its reverse climate conditions. During the summer and late autumn months, evaporation exceeded precipitation, so that snails were considerably reduced in numbers, and the balance of fluke infestation was seriously altered from the previous year.

On first examining the results, the figures do not appear to be strikingly in favour of vaccination. In the toxoid group 1.2 per cent. of the sheep succumbed to black disease, in the anaculture group 0.3 per cent., and of the unvaccinated controls 2.4 per cent.

However, if the 18 farms are arranged into groups of high, medium and low rates of mortality, and those in which only one immunising agent was used, then it is possible to assess the results in more accurate proportions (Table III). Group D includes only a small proportion of the total number of sheep, and consequently contributes little to the treated comparisons. It will be seen, however, that the results obtained at the three farms in this group are in general agreement with the results from groups A, B, and C.

In these groups the percentage mortality in the animals receiving the anaculture is consistently less than the per-

Table II. Field Vaccination Results (1947–48)

Farm	Total No. sheep	Total deaths from B.D.	Toxoid group			Anaculture group			Controls		
			Total	Deaths	Per cent. deaths	Total	Deaths	Per cent. deaths	Total	Deaths	Per cent. deaths
1	383	5	132	2	1·52	127	Nil	Nil	124	3	2·42
2	216	3	68	1	1·47	76	Nil	Nil	72	2	2·78
3	304	12	100	2	2	101	Nil	Nil	103	10	9·71
4	260	2	85	1	1·18	79	1	1·27	96	Nil	Nil
5	300	2	100	1	1	100	Nil	Nil	100	1	1·0
6	250	2	84	2	2·38	84	Nil	Nil	82	Nil	Nil
7	70	1	—	—	—	50	1	2·0	20	Nil	Nil
8	137	6	43	2	4·65	43	1	2·33	51	3	5·88
9	107	3	36	Nil	Nil	36	Nil	Nil	35	3	8·57
10	251	2	83	1	1·20	83	Nil	Nil	85	1	1·18
11	912	13	301	3	1·0	301	2	0·66	310	8	2·58
12	225	2	—	—	—	100	Nil	Nil	125	2	1·6
13	60	1	20	Nil	Nil	20	Nil	Nil	20	1	5·0
14	330	1	110	Nil	Nil	110	Nil	Nil	110	1	0·91
15	168	6	56	3	5·36	56	1	1·29	56	2	3·57
16	51	Nil	26	Nil	Nil	—	—	—	25	Nil	Nil
17	596	2	196	Nil	Nil	190	Nil	Nil	210	2	0·96
18	100	2	34	Nil	Nil	33	Nil	Nil	33	2	6·06
	4,720	65	1,474	18	1·2	1,589	6	0·3	1,657	41	2·4

TABLE III. VACCINATION RESULTS, GROUPED ACCORDING TO MORTALITY RATE

	Group	Toxoid group			Anaculture group			Controls			Total per cent. deaths
		Deaths	Total	Per cent. deaths	Deaths	Total	Per cent. deaths	Deaths	Total	Per cent. deaths	
A	Farm 8	2	43		1	43		3	51		4·4
	3	2	100		0	101		10	103		4·0
	15	3	56		1	56		2	56		3·7
	9	0	36		0	36		3	35		3·0
	18	0	34		0	33		2	33		2·0
	13	0	20		0	20		1	20		1·7
		7	289	2·42	2	289	0·70	21	298	7·05	3·42
B	Farm 2	1	68		0	76		2	72		1·4
	11	3	301		2	301		8	310		1·4
	1	2	132		0	127		3	124		1·3
		6	501	1·20	2	504	0·40	13	506	2·56	1·39
C	Farm 6	2	84		0	84		0	82		0·8
	4	1	85		1	79		0	96		0·8
	10	1	83		0	83		1	85		0·8
	5	1	100		0	100		1	100		0·7
	17	0	196		0	190		2	210		0·3
	14	0	110		0	110		1	110		0·3
		5	658	0·76	1	646	0·16	5	683	0·73	0·55
D	Farm 7	—	—		1	50		0	20		1·4
	12	—	—		0	100		2	125		0·9
	16	0	26		—	—		0	25		0·0
		0	26	0·00	1	150	0·67	2	170	1·18	0·87
Overall total		18	1,474	1·22	6	1,589	0·38	41	1,657	2·47	1·38

centage mortality in the animals receiving toxoid. This difference is statistically significant ($P<0.01$). Similarly, the animals receiving toxoid are significantly different from the controls ($P<0.01$) in groups A and B, but this difference is not significant in group C.

In view of the small number of deaths in group C, it is doubtful if the similarity of the toxoid and control animals is of any importance. It is therefore apparent that toxoid reduced the mortality to one-half or one-third of the controls, while the mortality in the animals receiving anaculture is only about one-quarter of the mortality in the toxoid group.

The superiority of anaculture over toxoid in these experiments may be due entirely to the better antitoxic response to anaculture which is obtained in sheep with a low-grade basal immunity. On the other hand, it is just possible that the anaculture, containing as it does the dead bacterial bodies, may produce an antibacterial immunity which plays its part in preventing the rapid multiplication of the organism in the liver substance.

In view of the observations by Turner and Eales (1943) that the " O " antigen of this group is composed of two fractions which are common to all strains, although varying in proportion, and further that the " H " antigens are heterologous, our field experimental results are not without significance. As the authors state, the dead bacterial bodies in formalinised anaculture were merely left on account of the expense necessary to remove them, and their value was not thought to be great. Our field experiments suggest that they might easily be necessary, as Henderson (1932) has shown to be the case in *Cl. chauvoei* infection, and further, if such be the case, the value of antigens containing plentiful proportions of both " O " fractions, requires further experimentation.

Field Vaccination, 1948-49. In this year, we found ourselves in exactly the same position as Turner on his second year of experimental vaccination. Farmers were no longer willing to have controls. For them, the disease which had been the cause of severe financial loss for many years had been diagnosed, and they had experienced the benefits of vaccination combined with liver fluke therapy, in the season 1947-48. We were left with no alternative but to permit the commercial distribution of the vaccine. We were successful, however, in arranging for the distribution of the vaccine so that we knew the farms in Caithness using it, and the number of sheep vaccinated. By March 31st, 1949, only 11 sheep had died of black disease in a total of 4,201 vaccinated.

Summary

1. The need for the complementary use of vaccine and liver fluke therapy in the control of black disease is discussed.
2. It was shown experimentally, that there was little advantage in a dose level above 2.0 c.c. of toxoid, alum precipitated toxoid or anaculture prepared from strains of *Cl. oedematiens* isolated from black disease lesions in sheep. Alum precipitated toxoid produced the greatest antigenic response at 38 days after primary injection.
3. With circulating antitoxin as the measurement there was sufficient evidence to suggest that anaculture was superior to toxoid when the treated sheep were grazed on infected pastures and possessed a low-

grade basal immunity. This difference was not apparent in sheep on non-infected pastures.

4. Under field conditions, in an experiment involving 4,720 sheep with unvaccinated controls, anaculture yielded a statistical advantage over toxoid-treated sheep. Toxoid reduced mortality to one-half or one-third of that in the controls, whereas anaculture given at the same levels of dosage reduced the mortality to about one-quarter of that in the toxoid group. In explanation of the superiority of anaculture over toxoid it has been suggested that the bacterial cells present in this product may be a factor of some importance.

ACKNOWLEDGMENTS

We are indebted to Miss M. Barr of the Wellcome Research Laboratories for carrying out the serum titrations. To M. H. Quenouille of Aberdeen University and J. W. Trevan, F.R.S., of Wellcome Research Laboratories for their advice and help in the statistical interpretation of the field experimental results. To J. J. Thompson and L. G. Donald for their untiring endeavours in the field. The work in Caithness and at the Aberdeen laboratory was made possible by a grant from the Agricultural Research Council.

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LIVESTOCK IN NORTHERN IRELAND

The following particulars of the numbers of livestock in Northern Ireland at April 1st, 1949, have been estimated from returns received from a representative sample of farmers. The figures are compared in the table below with the corresponding figures at April 1st, 1948, and the percentage changes which have occurred in the numbers since that date are also shown.

	April 1st, 1949.	April 1st, 1948.	Percentage Increase as compared with April, 1948.
CATTLE			
Cows and Heifers in milk ...	216,900	205,500	+ 5·55
Cows in calf but not in milk ...	88,100	97,300	− 9·46
Heifers in calf	62,500	65,400	− 4·43
Other Cattle	550,100	536,900	+ 2·46
Total Cattle ...	917,600	905,100	+ 1·38
SHEEP			
Ewes for breeding	277,100	250,300	+ 10·71
Other Sheep	208,600	258,700	− 19·37
Total Sheep ...	485,700	509,000	− 4·58
PIGS			
Sows for breeding	51,400	42,200	+ 21·80
Other Pigs	313,800	271,400	+ 15·62
Total Pigs ...	365,200	313,600	+ 16·45

THE VETERINARY RECORD

JULY 9TH, 1949

A USEFUL CONGRESS

Within a month veterinary representatives from at least 53 countries will be congregating in London to deliberate upon the contributions which veterinary science in its many applications can make towards the world's food problems. The Congress is organised so that the general picture is presented in six plenary lectures open to all and seven sections wherein the true veterinary problems will be discussed in detail. The total number of papers is large but it is hoped that discussion will be intense and well informed so that those attending will learn much which will be of assistance to them in their future work.

It cannot be denied, however, that the greatest benefit of such a conference arises out of the many informal discussions which follow those of an official nature. These ensuing conversations help to create true international friendships and often devolve upon the many interesting problems which arise in general practice. Attendance at the Congress is well justified for them alone.

The importance of the Congress is further enhanced by a link with that of the N.V.M.A., the association directing its own discussions to the problems of the small animals.

True to the custom of veterinary gatherings, ladies are welcomed and special arrangements have been made for them. An interesting series of visits and a social programme have been organised, limited only by the austerity of the times and its concomitant financial difficulties.

That the value of the Congress is fully appreciated by our colleagues abroad is evident from the number of their enrolments, which at the moment far exceeds that of veterinary surgeons from the United Kingdom. This, of course, should not be, for representatives of the host country will be conscious of the honour done to them by the International Committee in calling the conference in London, and will accept their responsibilities as hosts and welcome their overseas colleagues personally as members.

Knowing as we do that people on the spot generally enrol at the last moment, we would on this occasion, when the difficulties of organisation are so great, ask our members to enrol forthwith for the Fourteenth International Veterinary Congress commencing, as indicated above, in less than a month from to-day.

"A professional body which never gets any glory despite its importance to the nation."—The Mayor (Mr. A. R. Rook), welcoming delegates from all parts of Wales to a meeting of the South Wales Division of the National Veterinary Medical Association at Barry on June 24th.

CLINICAL COMMUNICATION

THE USE OF "AMPHOTROPHIN" (HEXAMINE CAMPHORATE—BAYER) IN THE TREATMENT OF SO-CALLED "HARD PAD DISEASE" IN DOGS

A Preliminary Note

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In view of the results the writer has obtained by the use of "Amphotrophin" in so-called "hard pad disease," it is felt that a record of two cases, which showed particularly rapid response to treatment, might be of interest to practitioners.

CASE 1.

Subject.—Wire-haired Fox Terrier dog, 5 months old, not vaccinated against canine distemper.

This dog belonged to the writer who had attended several cases of "hard pad disease" prior to the onset of the dog's illness. The latter commenced during the first week of November, 1948, with symptoms resembling canine distemper. In view of the lack of response to canine distemper serum, so-called "hard pad disease" was suspected and large doses of "hard pad" serum were given intravenously and subcutaneously. This also appeared ineffective.

After 10 days, a clinical picture of so-called "hard pad disease" developed, the heavy induration of the pads commencing at the periphery and extending rapidly towards the centres (cf. corns). Deep and painful fissuring followed and the dog became prostrate.

Prostigmin, given intermittently over the next three weeks, evoked only a slight temporary improvement after each injection. Blood transfusions were unsuccessful.

The condition gradually deteriorated until the end of February, 1949, by which time the dog appeared blind in both eyes. Muscular and nervous co-ordination were also seriously affected and cachexia was general and marked. Preparations containing vitamins A, B_1 and C were administered but the dog lapsed into a moribund state.

Bearing in mind the effects of "Urotropine" in the treatment of tetanus, in "breaking down" the blood-brain barrier[1], the writer decided to administer "Amphotrophin." A graduated dose of 2, 4, 6 and 8 mls. was administered by *slow intravenous injection* at 48-hour intervals and systemic improvement was noticeable even within a few hours of the first injection. Resolution of the eye condition was, however, more gradual. Output of deep yellow-coloured urine was profuse.

From this point onwards, the dog made a complete and uneventful recovery, eyesight returning to normal by the middle of March. At the time of writing, the dog remains normal.

The above case is described in some detail in view of the severity and duration of the illness and the immediate response to the introduction of "Amphotrophin."

CASE 2.

Subject.—Red Setter dog, 7 months old, vaccinated canine distemper.

This case had been treated for 3 weeks before presentation to the writer. Examination suggested canine distemper, the usual treatment, however, meeting with no response. After an interval of 7 days, the patient's condition had deteriorated, the pads becoming excessively hard, particularly at the periphery. Coughing was frequent and the dog vomited bile-stained material. Profuse catarrhal conjunctivitis was present, the eyes showing a tendency to roll. Temperature remained at 103 deg. F. to 103.4 deg. F.

An initial dose of 2.5 mls. "Amphotrophin" was given by slow, intravenous injection, the animal appearing much brighter within a few hours of the treatment. A second dose of 5 mls. was injected and up to the time of writing, the dog appears to be recovering along the lines mentioned in the first case.

The value of this drug in relation to diseases of dogs associated with affection of the nervous system, is being investigated and concurrent bio-chemical analysis is being employed to ascertain the pharmacological and physiological basis.

REFERENCE

[1] EDWARDS, J. T. (1948.) *Vet. Rec.* **60.** 259.

ABSTRACTS

[Studies on Equine Purpura Haemorrhagica. No. III—Morbid Anatomy and Histology. KING, A. S. (1949.) *Vet. J.* **105.** 35-54.]

Post-mortem and histological findings on five cases, clinically diagnosed as equine purpura haemorrhagica, are reported. While these differed in some respects from those given in the usual text book accounts, they did in general support the clinical diagnosis. All five horses showed widespread oedema of the subcutaneous tissues and intermuscular fascia, but haemorrhages there—absent from one horse—were variable in frequency even when present, and were scanty in one horse. There were petechiae in the nasal mucosa of one horse, but in none of the horses were haemorrhages seen in the internal mucous membranes. Two horses showed petechiae on the heart and two on the spleen. Four of the horses had suppurative foci in the lungs. There were histological signs of oedema in the lungs, and the possibility is mentioned that this oedema might predispose to pneumonia. In one horse there was an oedematous thickening of the wall of the duodenum, and in another of the wall of the stomach.

The peritoneal cavity of three horses contained a large quantity of yellowish oedema fluid. In three horses, the kidneys showed histological lesions, which in one horse, at any rate, resembled those found in the human kidney in cases of the "crush syndrome"; however, the examination of blood and urine samples from two other horses during life gave no evidence of renal failure. In four of the horses the skeletal muscles showed scattered reddish-black areas of degeneration and haemorrhage, which were numerous in two of the four animals; histological examination suggested that the muscle lesions passed through stages of hyaline degeneration, fragmentation, interstitial haemorrhage, removal of débris by macrophages, and repair by fibrosis. A comparison is drawn between these muscle lesions and those seen, for example, in fatal cases of pneumonia secondary to influenza in man.

The findings are discussed at length and it is suggested that, in equine purpura haemorrhagica, the main factor

in the pathogenesis is probably damage to capillary endothelium resulting in widespread oedema, haemorrhage occurring secondarily and to a variable extent.

E. C.

* * * * *

[Immunisation Against Louping-Ill. I.—Vaccines Prepared from Chick Embryo; II.—Immunisation of Man. EDWARD, D. G. F. F. (1948). *Brit. J. Exp. Path.* **29.** 367-372 (15 refs.) and 372-378 (8 refs.)]

I.—Formalinised vaccines, prepared from infected chick embryos and tested within seven weeks of their preparation, protected sheep against challenge with louping-ill virus. They were unstable and lost their ability to immunise after 17 weeks' storage.

Unsuccessful attempts were made to remove a significant proportion of the tissue protein from the embryo suspensions by methods employing selective adsorption and elution, or precipitation of protein at the isoelectric point.

The stability of louping-ill virus in phosphate buffer at various hydrogen ion concentrations was studied. Stability was not increased by 1:1,000 cystine hydrochloride.

II.—The author draws attention to risk run by workers engaged in louping-ill vaccine production. In 4½ years, 11 infections (7 retrospectively) were diagnosed among workers in one laboratory. To lessen such risk, the author attempts to devise a method of immunising the human subject. He determined the effectiveness of vaccines by inoculating volunteers and observing the subsequent complement-fixing and protective antibodies in their sera. Formalinised vaccine from infected chick embryos proved to be valueless. Antibodies developed to high titre in three persons receiving three doses of a formalinised mouse brain vaccine. Vaccination caused local reactions in two of them.

A. W. G.

THE INSTITUTE OF MEAT

Membership of the Institute of Meat (reports the *Meat Trades Journal*) continues to show a steady increase. At the last meeting of the Council a further 100 applicants were admitted, bringing the total membership to 2,086. Good progress has also been made in the distribution of Permanent Certificates of Membership, and in spite of the detailed work involved in their preparation, coupled with staff shortages, over half the members have now received their copies.

It is hoped that the Institute will soon be able to begin to fill a long-felt want by the provision of a library on meat trade subjects. This will be established as a memorial to the Institute's first President, the late Mr. A. C. Knight, whose two sons recently asked the Institute to act as a Trustee to a sum of money they had put by to form a Knight Memorial Fund. It is hoped that an announcement will be made later in the summer.

Discussions are still going forward regarding the introduction of a Craft Examination. Two meetings have been held on the subject recently and many thorny problems encountered. The greatest difficulty probably arises from the fact that owing to the nation-wide shortage of instructors and accommodation, the Craft course will have to be run (at least in the initial stages) in conjunction with the Ordinary Certificate Examination.

* * * * *

PRESERVATION OF KERRY CATTLE

The Irish Times of June 14th records that Mr. Dillon, Minister for Agriculture, told the Kerry Committee of Agriculture that his Department had prepared a scheme for the preservation of the Kerry breed—the only indigenous breed of cattle in the country. Senator Wolfe said that the Committee would give careful consideration to the Department's scheme for Kerry cattle. In the course of the subsequent discussion Mr. Dillon said that his Department would not be in a position to give subsidies on Kerry cattle.

REPORT

[Rinderpest Vaccines: Their Production and Use in the Field. Report of Proceedings of the F.A.O. Nairobi Rinderpest Meeting, 1948. Arranged and edited by K. V. L. Kesteven, Washington, U.S.A. Published in Washington, March, 1949, as F.A.O. Agricultural Study, No. 8.]

This booklet of seventy-one pages reports the proceedings of a conference arranged by F.A.O. in co-operation with the Colonial Office and held at Nairobi in 1948.

The conference was under the chairmanship of Sir Daniel Cabot and was attended by 38 delegates, most of them from various African territories, both British and foreign. There were also three representatives from Great Britain, two from China and one each from the U.S.A., India and France.

Daubney, R., in a paper on the goat-virus vaccine, gives a general historical account of its development, which rather understates the importance of J. T. Edwards' work at Muktesar, and which might give the impression that we owe this vaccine to Schein's work in Indo-China.

[Schein did passage the virus in goats and used blood from infected goats as a source of virus for use in the serum-simultaneous method of immunisation. In 1920, and again in 1924, he stated that passage of the virus in goats did not cause it to become attenuated. In 1926, however, he stated that his earlier conclusion had been too hasty and that serial passage in the goat did cause attenuation. He never used the attenuated virus alone—without simultaneous serum—as a vaccine and his colleague, Jacotot, who succeeded him in 1927, continued to use and to work on the improvement of the chemically inactivated tissue vaccines, of which he was one of the pioneers. Edwards, between 1922 and 1929, endeavoured to produce an attenuated virus which could be used as an immunising agent in the manner of Jenner's vaccine for smallpox in man. Following this line of research, he used first the rabbit and later the goat, and succeeded in 1926 in passaging the virus in that animal. All the great work which has since been done in India, Burma and, much later, in Africa, stems directly from Edwards' work and many millions of cattle have been immunised in India and Burma with his goat-adapted strain.

There can be no doubt that Edwards was the originator and pioneer of the goat-adapted virus method of immunisation as we know it to-day.]

Following the general survey an account is given of the work done in Kenya since 1936, in which year the Muktesar strain of goat virus was brought to Kabete from India. The Muktesar strain proving to be rather too virulent for the Kenya cattle, Daubney and Hudson passaged four Kenya strains in the goat and one of these became what is now generally known as the K.A.G. or Kabete goat-adapted strain. It was not until the 250th passage in goats that it was considered to be sufficiently attenuated to be released for general use in the field. Daubney considers it possible that the strains underwent some further slight attenuation between the 250th and the 400th passages, but from then onwards there is no clear evidence that it has changed appreciably. It is still too virulent to be used on cattle which have more than 50 per cent. of the blood of European breeds. A sub-strain of the K.A.G. strain has been produced at Vom by further passages in Nigerian goats; this strain is apparently appreciably milder than the K.A.G. strain. Goats vary in their susceptibility

to rinderpest and in passaging the goat-virus susceptible types have been used; Daubney suggests that further attenuation might be possible by passage in a resistant type of goat.

In immunisation campaigns virus should be distributed in the form of dessicated spleen, as wet virus in the form of spleen pulp emulsion is fragile and its keeping qualities poor. Even in the dessicated form it must be stored at low temperatures (−15 deg. to −25 deg. C.) and when it has to travel far, ice or dry ice should be used to keep it cool *en route*. The simultaneous injection of antiserum to control severe reaction is not advised as, unless the dose is very small, the reaction is blocked out with failure to immunise. For the same reason preliminary use of an inactivated tissue vaccine is not advised. Daubney considers that for all practical purposes reacting cattle may be considered as non-infective, although he does consider it possible that rinderpest may have been spread among goats in India by the use, in the early days, of strains which had been given only a few goat passages. In Africa, rinderpest has not been recorded in goats, although some millions of cattle have been immunised with goat virus: this Daubney considers may be due to the fact that virus was not released for field use until it had had at least 250 goat passages. Experiences in Kenya in 1942-44 and in Egypt in 1947 are cited which indicate that mass immunisation with goat virus may be an effective means of eradication. [Support for this view is also available in the well-documented work done in Burma between 1936 and 1942 by Mitchell and Pfaff.] In the discussion attention was directed to the technique of the desiccation process and to the loss of titre which occurs during drying; more effective equipment is desirable. Unnecessarily frequent passages in goats are possibly unwise lest the character of the virus be altered. The need for biological tests of vaccine before issue to exclude anthrax and other bacterial infections was mentioned. The chief defect of the goat-virus is that some mortality results from vaccination, especially in susceptible breeds of cattle, but in spite of this its effectiveness is such that until a better vaccine becomes available it must continue to be used.

Shope, R. E., opened a discussion on inactivated vaccines and cited the work done at Grosse Isle during the war with formalin and with chloroform inactivated vaccines. It was not possible at Grosse Isle to produce an inactivated vaccine from infected chick embryo tissues. A great disadvantage of the present inactivated tissue vaccines is their expense. In the discussion the improvement which French workers had obtained by the use of adjuvants such as alumen gel was mentioned. By the use of these adjuvants the cost of production could be reduced. Such vaccines were of value in immunising cattle of highly susceptible breeds. Some evidence was quoted which indicated the possibility that during the period when immunity was declining, sub-clinical infections might be contracted by vaccinated cattle. The difficulty in immunising calves was discussed and it was considered that there was urgent need for further research on this problem.

Cheng, S. C., Chow, T. C., and Fischman, H. R., presented a paper on the use of avianised rinderpest vaccine in China. 200,000 doses of avianised vaccine prepared at Grosse Isle were used in China. Attempts to produce this vaccine in China failed as the seed virus from Grosse Isle was lost; neither did success attend efforts to adapt to the egg Chinese field strains and a strain obtained from Cairo. An egg-adapted strain obtained from Kabete was successfully passaged in the egg after two preliminary passages in calves. A Kabete bovine strain has also been passaged in eggs but is still too virulent for use as a vaccine.

In the discussion other members reported difficulty in adapting bovine strains to the egg and it appears that at present the only bovine strain which has been adapted to the egg in any part of the world is the Kabete strain. Field experience of the use of this vaccine is still meagre.

Cheng, S. C., and Fischman, H. R., read a paper on the rabbit-adapted virus and discussed the findings of various workers since Edwards' first publication on the subject in 1924. Nakamura and his school in Japan produced a rabbit strain which was sufficiently attenuated to be used as a vaccine and that strain is now in use in China. It has been sent to Kabete, Cairo, Gambia, India and Nigeria, where it is being studied. The Japanese strain produces characteristic lesions in the intestines of the rabbit and these are illustrated by photographs. This strain causes only a slight reaction in cattle of highly susceptible breeds such as Jersey, Ayrshire, Shorthorn and Holstein dairy cows imported into China from the U.S.A. The vaccine seems to have great possibilities, but its use in China is hampered by a shortage of rabbits. In an effort to surmount this difficulty trials are being made using reactor virus, that is virus taken from a calf which is reacting to injections with the rabbit virus. Similar trials are being made using goats. From one rabbit 500 doses of vaccine can be obtained. The duration of immunity has not yet been determined.

At the end of the conference a series of conclusions was adopted and these are detailed under various heads. Perhaps the most important of these is the first, which states that it is the considered opinion of the meeting that the vaccines now available render the eradication of rinderpest a practical possibility which should be carried out without further delay.

The report is a useful summary of present knowledge and will be particularly valuable for the information regarding the rabbit-adapted virus which it contains. Its value would have been increased had it been possible to give the names of those who made important contributions to the discussions on the various papers.

M. C.

U.S. FARMING EXPERTS TO VISIT AFRICA

E.C.A. Technical Assistance

The Secretary of State for the Colonies announces that three United States agricultural experts are to conduct a three-month survey of farming conditions in East, Central and West Africa. They are Dr. W. V. Lambert, Dean of the College of Agriculture, University of Nebraska; Dr. W. A. McCall, assistant chief of the Bureau of Plant Industry, Soils and Agricultural Engineering of the United States Department of Agriculture; and Dr. Arthur H. Cline, Professor of Soil Science, Cornell University.

The present survey, which is part of the Economic Co-operation Administration's technical assistance programme, is intended to help the agricultural and veterinary departments of the East, Central and West African territories in the general field of production, and in developing veterinary research, plant pathology and soils science, by finding out how best American technical agricultural assistance can be applied.

* * * * *

Weekly Wisdom

". . . '*without history a man's soul is purblind, seeing only the things which almost touch his eyes*' . . ."—Quoted by Dr. Norman Sykes (*The Times*, June 15th, 1949.)

THE N.V.M.A. COUNCIL MEETING IN EDINBURGH

In the event, fulfilment of the annual obligation laid upon Council to conduct its business over the Border inevitably acquires something of a social aspect in the hospitable atmosphere of Edinburgh. The one regret was occasioned by the inadequate proportion of Southerners among the 31 members at the meeting held at the Royal (Dick) Veterinary College on June 24th, despite the appeal for their improved attendance made by the President at the crowded London Council meeting in April.

In tone with this geniality was an unusual number of refreshing features. There were, for example, two occasions for warm congratulation. Dr. Edwards voiced the feelings of all in his references not only to the efforts made by the President on behalf of the Association but to his heading of the poll at the recent R.C.V.S. Council election, while Dr. Montgomerie himself made a most acceptable intervention on the agenda to convey the gratification of all his colleagues on the Council to Mr. Weipers on the recognition of his worth by Glasgow University Court in honouring him by appointment as its first Director of Veterinary Studies, on the transference of the Glasgow School to the academic fold.

The recommendations for the election of officers to be made to annual general meeting—which evoked a presidential tribute to past services—include a new and most welcome entrant to "honorary official" circles in Mr. S. F. J. Hodgman, of the Canine Research Department of the Animal Health Trust. Here, as in the instance of Mr. Weipers, we see the honouring of an unassuming, able worker with a practitioner background: an admirable selection for the post of Junior Vice-President and President-Elect. The other recommendations we may almost term automatic: of Mr. J. W. Bruford as President, Dr. R. F. Montgomerie as Senior Vice-President, Mr. H. E. Bywater as Hon. Treasurer and Mr. G. N. Gould as Hon. Secretary; a team which has proved its worth.

A further decision affording particular pleasure was the intimation that the recipient of this year's award of the Dalrymple Champneys Cup and Medal for published work promoting the advancement of veterinary science is to be Mr. H. E. Hornby. The background of an International Congress—and may we be permitted to add, the selection of his masterly article on trypanosomiasis research to inaugurate the amplified journal of the Association at the half-year—render the more appropriate the bestowal of this trophy upon one whose repute in this field is world wide.

The remaining business was largely a record of the successful prosecution of work in progress, and which was reported upon relatively recently. Mention should be made, however, of the following: an intimation was received from the Organising Committee that representatives of the Association and the R.S.P.C.A. had met on June 15th, and that a revised agreement had been arranged subject to some slight re-drafting, and consideration by the R.S.P.C.A. of the Association's suggestion that provision be made for "assisted treatment" (in cases of need, where protracted treatment or the expense of a major operation is involved).

Council was informed that a tripartite meeting with the Ministry of Agriculture and the National Farmers' Union had been held on June 7th, when the scheme for the control of certain diseases of dairy cattle was discussed. The Association's representatives had expressed the view—with which the Ministry representatives associated themselves—that it was impracticable to arrange a new scheme which would prove equitable in application throughout the country. It was agreed, however, that the Ministry in consultation with the Association would explore the possibility of some form of overall contract scheme to cover disease control on the farm—a basis which could be adapted to meet local requirements.

The Veterinary State Medicine Committee also reported that, with regard to the anomalies in the arrangements for inspection under the Horse Breeding Act (Licensing of Stallions), the Association had the support of the R.A.S.E. and of practically all the Breed Societies. It was hoped to arrange a joint meeting early in the autumn to discuss what further action could be taken. An interim report drawn up by the Joint B.M.A.—N.V.M.A. Committee on the present position relating to milk, and the legislative proposals now before Parliament, was discussed and it was agreed that it be not accepted in its present form.

The activities of the same Committee (including the officers) reflected the efforts to secure considerable improvement, from the veterinary point of view, in the official arrangements for implementing the Food and Drugs (Milk and Dairies Act), 1944.

The Home Appointments Committee had before them a "most disappointing" report on information as to the conditions of employment of young graduates accruing from the re-iterated request in the *Record* that the salary or range of salary offered, should be stated in advertisements for assistants. Among the further steps to be taken to secure this essential information is the enlistment of the aid of the secretaries of divisions.

Inasmuch as the Editorial Committee has had numerous requests from readers for particulars as to the technique, etc., of the use of rubber bands for dishorning cattle, the Technical Development Committee has decided to seek information as to the humaneness of this method; the Committee will then be in a position to consider the matter further.

Cordial thanks were voted to Professor Mitchell, Principal of the Royal (Dick) College, for the excellent facilities enjoyed by the N.V.M.A. Committees and Council.

VETERINARY SURGEONS ACT, 1948

SUPPLEMENTARY VETERINARY REGISTER

Restriction of Practise of Veterinary Surgery by Unqualified Persons

NOTICE IS HEREBY GIVEN that the persons set out below, resident at and working at the addresses given below their names, and being persons without a veterinary qualification registrable on the Register of Veterinary Surgeons, have applied for registration on the Supplementary Veterinary Register.

The conditions for registration on the Supplementary Veterinary Register are that an applicant has attained the age of 28 and satisfies the Council of the Royal College of Veterinary Surgeons:—

(*a*) that he is of good personal character;

(*b*) that during the ten years immediately preceding the application he has for a period of not less than seven years in the aggregate been engaged in the United Kingdom as his principal means of livelihood in diagnosing diseases of animals and giving medical or surgical treatment to animals:

Provided that the Council may authorise the registration of a person under this section who has been engaged as aforesaid during the said ten years notwithstanding that he has been so engaged for less than seven years in the aggregate if the Council are satisfied that the time during which he was so engaged was reduced by reason of his serving in His Majesty's forces or being engaged in work of national importance and that his registration would not be prejudicial to the public interest.

Any person having any OBJECTION to the registration of any applicant or desiring to lay any information before the Council thereon should communicate with the undersigned at the Royal College of Veterinary Surgeons, 9/10, Red Lion Square, London, W.C.1, not later than 30 days after the publication of this notice, provided that an extension of the period for objection may be allowed if good cause be shown for such extension.

W. G. R. Oates,
Registrar.

Veterinary Surgeons Acts, 1881–1948.

The Second List of Names of Persons who have applied for Registration

Number	*Name and Address*	*Place of Practice*
S.V.R.142	Allender, Norman, Darley House, Hospital Road, Farnworth.	50, Egerton Street, Farnworth, Nr. Bolton; *and* home address.
239	Barnett, Miss A. L. J., 33, Mayford Road, S.W.12.	P.D.S.A., 172, Tooting High Street, S.W.17.
111	Baron, Alfred Frank, Wayside, Coldharbour Lane, Hildenborough, Kent.	The same address.
150	Blakeway R., The Mount, Kilcock, Co. Kildare.	The same address.
169	Bond, S., 23, Cranleigh Gardens, Luton, Beds.	The same address.
160	Bryer, R. F., 43, Lancaster Road, North Harrow, Middx.	The same address.
185	Bunn, E. A. J., 75, Redbridge Lane, Ilford, Essex.	P.D.S.A., Woodford Bridge Road, Ilford, Essex.
218	Cowell, James, 72, Berwood Farm Road, Sutton Coldfield, Warwicks.	Birmingham Co-operative Society, Ltd., 48, Ashted Row, Birmingham, 7.
203	Crisp, George, 90, Chestnut Avenue, Romford, Essex.	P.D.S.A., 426, Hoe Street, Walthamstow, E.17.

Number	*Name and Address*	*Place of Practice*
85	DAVIES, Cyril C., 5, The Ridgeway, Woodingdean, Sussex.	The same address.
193	DOBSON, H. F., 44, Baron Gardens, Barkingside, Essex.	P.D.S.A., Woodford Bridge Road, Ilford, Essex.
166	DREDGE, H. W., 192, Colney Hatch Lane, Friern Barnet, N.10.	227, Regent's Park Road, Finchley, N.3.
187	ELLIS, M. M., Rolfes Hollow, Stone, Bucks.	P.D.S.A., 41, George Street, Oxford.
129	ESTCOURT, F. E., 3, Harlington Road West, Feltham, Middx.	The same address.
133	FAWSSETT, L. L., 5, Clarendon Road, South Woodford, Essex.	P.D.S.A., Woodford Bridge Road, Ilford, Essex.
24	FLECK, P., Kingspark, 44, Ombersley Road, Worcester.	The same address.
263	GASKIN, George, High Street, Ixworth, Suffolk.	The same address.
81	GOLDSMITH, A., Bewlay Slip End, Nr. Baldock, Herts.	106, Bancroft, Hitchin, Herts.
237	GRAVES, James, 2, Abbotsford Avenue, Rutherglen, Lanarkshire.	P.D.S.A., 5, Windsor Terrace, Glasgow, N.W.
122	GROVES, Mrs. N. C., Grovecote, Preston Road, Yeovil.	The same address.
157	HAINES, N., 48, Lincoln Street, Leicester.	The same address.
31	HAMBLIN, A. E., 217, Dartmouth Road, Sydenham, S.E.27.	The same address ; *and* 25, Upland Road, East Dulwich.
30	HAMBLIN, Mrs. R. M., 217, Dartmouth Road, Sydenham, S.E.27.	The same address ; *and* 25, Upland Road, East Dulwich.
173	HAYES, C. N., North Lodge, Kingston Road, Ewell, Surrey.	The same address ; *and* 40, Coombe Road, New Malden, Surrey.
86	HENSON, Mrs. M., 33, Crouch Hill, N.4.	The same address.
251	HEWSON, J. S., Solway House, Rigg of Gretna.	The same address.
95	HICKMAN, Miss J., 146, Marlborough Avenue, Hull, Yorks.	The same address ; *and* 49a, Church Street, Whitby, Yorks.
184	HITCHON, W. G., 20, Icen Way, Dorchester, Dorset.	The same address.
234	HORNE, L., 221, Barnsley Road, Sheffield, 4.	Sheffield Hospital for Sick Animals, 98, West Bar, Sheffield, 3.
143	HOSE, Alfred T., 41, Marlow Road, Anerley, S.E.20.	P.D.S.A., Woodford Bridge Road, Ilford, Essex.
158	HOWITT, E. J., 48, Lincoln Street, Leicester.	The same address.
67	HURST, W. P., 22, Park Road, Bromley, Kent.	P.D.S.A., 31/32, Cork Street, W.1.
147	HYDE, Gerald, 9, Elmfield Avenue, Malton Road, York.	The York and District Animals' Hospital, 14, Newgate, York.
42	JAMES, J. Clarke, Whitehall Wick, Dursley, Glos.	The same address.
21	JENKINS, E. E., 4, Lady Jane Street, Aberavon, Port Talbot.	The same address.
174	JESSOP, W. J., 82, High Street, Hastings, Sussex.	P.D.S.A., 82, High Street, Hastings, Sx.
162	LOTCHO, L. C., 620, Sidcup Road, Eltham, S.E.9.	381, Lewisham High Street, Lewisham, S.E.13.
76	LOW, L. A., Scaldwell, Northants.	The same address.
127	LOWRIES, R. J., The Lodge, Woodhaw, Egham, Surrey.	90, Uxbridge Road, Ealing, W.13.
119	MASSEY, J. R., 75, Warwick Road, Banbury, Oxon.	The same address.
210	MURGATROYD, H. M., 183, Abbeydale Road South, Beauchief, Sheffield, 7.	The same address.
181	NEWMAN, Jack, 7, Harts Green Road, Harborne, Birmingham, 17.	P.D.S.A. Mobile Dispensary, 8, Ford Street, Coventry.
88	NIGHTINGALE, E., 176, Harwood Street, Darwen, Lancs.	The same address.
163	PACKMAN, G. I., 60, Edmaston Road, Dunkirk, Nottingham.	P.D.S.A., Dunkirk, Nottingham.
170	PIKE, E. T., 73, Pleckgate Road, Blackburn.	95, Whalley Road, Accrington, Lancs.
197	PRESTON, E. C., Wabana, Lackford Avenue, Totton, Hants.	P.D.S.A., 84, St. Mary's Road, Southampton, Hants.
154	REYNOLDS, E. J., Isbay House, Great Ellingham, Attleborough.	The same address.
4	SAWARD, J. J., 8, Portland Road, Hove, 3.	The same address.
195	SHEEN, R. B., 250, Staines Road, Laleham, Middlesex.	The same address.
149	SHEPHERD, Walter, 168, Gipsy Road, Welling, Kent.	2, Avery Hill Road, New Eltham, S.E.9 ; *and* same address.
217	SIMPSON, Miss P. J., 21, Ridgeside Avenue, Withdean, Brighton, Sussex.	The same address.
200	SPIERS, Mrs. E. M., 3, Montague Place, Brighton, 7, Sussex.	16, Oxford Street, Brighton, 1, Sussex.
107	TINGLEY, G. W., Millstone Farm, Chailey, Sussex.	The same address.
50	WAKE, S. F., Terrington St. Clement, Nr. King's Lynn.	The same address.
165	WALKER, R., 15, Burnock Street, Ochiltree, Ayrshire.	The same address.
84	WATKINS, T., 36, Dalston Lane, E.8.	The same address.
132	WATSON, Miss E. J., Snowdrop Valley, Crich, Nr. Matlock, Derbyshire.	The same address.
215	WELCH, P. C., The Priory, Saffron Walden, Essex.	The same address.
141	WELLS, J., 33, Weymoor Road, Birmingham, 17.	15, Islington Row, Birmingham, 15.

QUESTIONS IN PARLIAMENT

Sheep Dipping (Regulations)

Mr. HURD (June 30th) asked the Minister of Agriculture if his Department has tested the effectiveness and economy of spraying sheep with DDT and similar preparations compared with using arsenical dips as a means of destroying parasites and preventing scab infection ; and if he intends to amend the sheep dipping regulations to take account of new knowledge.

THE MINISTER OF AGRICULTURE (Mr. THOMAS WILLIAMS): I am advised that DDT is not effective against sheep scab and that under farm conditions spraying, even with preparations that are effective, would not normally give such good control as dipping. The regulations (which relate only to sheep scab) have been amended to permit single dipping (in place of double dipping) with dips containing certain of the new preparations, but I do not propose to amend them to permit spraying.

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Fowl Pest, Bedfordshire

Mr. SKEFFINGTON-LODGE (June 30th) asked the Minister of Agriculture, in view of the prevalence of fowl pest in parts of Bedfordshire what steps he is taking to deal with the outbreak and to stop its spreading ; how many birds have so far been destroyed ; and what plans are in hand to compensate poultry owners who may be affected.

Mr. T. WILLIAMS: Most of the recent outbreaks of fowl pest in Bedfordshire have resulted from the sending of infected birds to certain markets. My inspectors are trying to trace all the birds that have been exposed to infection and, as these birds are traced, restrictions are imposed to prevent further contacts. All birds on premises where fowl pest occurs are slaughtered. About 1,450 birds have been slaughtered, and compensation is being paid to the owners of all birds not affected with fowl pest which have been slaughtered by direction of my department.

Mr. SKEFFINGTON-LODGE: Can my right hon. Friend confirm that in some cases people selling poultry give false names and addresses; and, if that is so, is there any means of stopping this practice, which is leading to the spread of this disease ?

Mr. WILLIAMS: I could not confirm that rumour but if any information is brought to my notice I will gladly have it looked into.

Cats (Medical Research)

Mr. Granville (June 30th) asked the Secretary of State for the Home Department if he is aware that at the present time cats are being imported from Ireland for medical research; that sometimes they are packed so tightly that they arrive at their destination dead or dying, as happened recently at Cambridge; that these animals are made to undergo painful experiments, sometimes enduring weeks of agony, in the interests of science; and what steps does he intend to take to stop this unnecessary suffering.

Mr. Ede: I am not aware that cats are now imported from Ireland for medical research. In 1947 some cats were sent from Ireland to Cambridge. The person in Eire responsible for the despatch of the cats was prosecuted and convicted. The seven cats received were used for class demonstrations for which purpose the experiments were made under anaesthesia throughout, the cats being killed before they recovered consciousness.

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Animals (Slaughter)

Mr. Peter Freeman (June 29th) asked the Minister of Food how many animals were slaughtered last year with and without the humane killer of each variety separately; and how many were killed by electric stunning.

Dr. Summerskill: 1,693,603 cattle, 1,291,958 calves, 5,692,404 sheep and 108,591 pigs were slaughtered in 1948 in slaughterhouses used by my Department. 932,409 pigs were slaughtered in bacon factories. Of these all but about 80,000 cattle, 40,000 calves and 144,000 sheep were killed with the humane killer or by electric stunning. I regret that the numbers slaughtered by the humane killer as distinct from electric stunning are not separately recorded.

Mr. Freeman: In view of the very large number of animals that are killed without the humane slaughter methods, and the fact that the R.S.P.C.A. and other organisations are offering to provide captive bolt pistols free to farmers and others who are prepared to use them, would the right hon. Lady say what further steps can be taken to see that all animals are killed by humane methods, as recommended by this House?

Dr. Summerskill: Certainly, we have taken steps and we gave instructions in March, 1948, but I must remind my hon. Friend that some animals are killed by the Jewish and Mohammedan methods, the practice of which we do not control.

Brigadier Rayner: Does the right hon. Lady realise that our abattoir system involves a great deal of thoughtless cruelty and is something of a disgrace to a civilised country?

Dr. Summerskill: Certainly not. Since the Labour Government have been in power conditions in the abattoirs have greatly improved.

NOTES AND NEWS

Diary of Events

July 13th.—Meeting of the N.V.M.A. Editorial Executive Committee, 36, Gordon Square, W.C.1, 2.30 p.m.

July 15th.—Annual Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region) at the Veterinary Field Station, "Leahurst," Neston, Wirral, 2.30 p.m.

July 15th.—Second Annual Meeting of the Association of Veterinary Teachers and Research Workers (Southern Region), at the Royal Veterinary College, Camden Town, N.W.1, 2 p.m.

July 15th.—Meeting of the Mid-West Division, N.V.M.A., at Bristol (Berkeley Café, Clifton), 2.15 p.m.

July 21st.—Summer Outing of the Central Veterinary Society to Newmarket. (*See notice.*)

July 22nd.—Meeting of the Royal Counties Division, N.V.M.A., at Oxford (Randolph Hotel), 12 noon.

July 22nd.—Meeting of the Yorkshire Division, N.V.M.A., Penicillin Factory, Barnard Castle, 2 p.m.

Aug. 8th to 13th.—Fourteenth International Veterinary Congress, Central Hall, Westminster, and Church House, Westminster, London, S.W.1.

Aug. 12th to 15th.—Sixty-seventh Annual General Meeting and Congress, N.V.M.A., in London.

CONDITIONS OF EMPLOYMENT OF YOUNG GRADUATES

We would draw the attention of intending advertisers in our "Appointments Vacant" column to the request made therein that the salary or salary range offered be stated in their announcements. This request is made in order that the Home Appointments Committee may acquire the evidence requisite for their consideration of the conditions of employment of young graduates, an enquiry in which the Committee is being seriously handicapped by the disappointing response met with hitherto. If, despite the Committee's appeal, any members are not prepared to respond through the medium of their advertisements they are urged, nevertheless, to make the desired information available by advising the Editor of the terms of remuneration offered.

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XIVth International Veterinary Congress

The A.V.M.A. European Tour

As the majority of our readers will be aware, a feature of the overseas attendance at Congress will be the presence, as the primary object of their journey, of an American party enjoying an escorted tour of Europe under the leadership of Dr. D. M. Campbell, Editor of *Veterinary Medicine*, Chicago.

Places that catch the eye in the thoroughgoing main itinerary (from July 15th to August 29th) one would expect under such auspices, are Copenhagen, Stockholm and Oslo—there is to be a three-day tour of Norway—Amsterdam, Brussels and Paris, while on their visit to these islands the delights of Edinburgh and the Lake District have been selected for the party. There is also an optional extension tour (August 23rd to September 3rd) through Switzerland.

In forwarding the subjoined list of those making the tour Dr. Campbell writes: "I do not know how many American veterinarians in addition to these will attend the Congress, but I think most of those on the programme will go, and some others. For example, Dr. J. E. Salsbury, President of the Salsbury Laboratories, Charles City, Iowa, and Mrs. Salsbury, and Dr. Jack Knowles, Miami, Florida. I know also that Professors George H. Hart, J. R. Beach and W. R. Hinshaw, all of the College of Veterinary Medicine, University of California, will attend; in fact, they will be in London some two weeks before the Congress.

"Many more would have attended—in fact, 75 or more would have gone on the tour—if it had been possible to obtain boat transportation on the return trip before September 1st, but very little has been available. I am sure this scarcity of Transatlantic shipping has cut down the American attendance at the Congress by 50 per cent.

"Our party was unable to obtain accommodation at any one hotel in London and so it will be divided among the Mayfair, Hyde Park, Russell Square and perhaps one or two others."

Personnel A.V.M.A. European Tour, 1949

Dr. W. A. Hagan, Dean, N.Y. State Veterinary College, Ithaca, N.Y., and Mrs. Hagan.
Professor H. R. Guilbert, University of California, Davis, Calif., and Mrs. Guilbert.
Dr. A. E. Bott, President, Corn Belt Laboratories, East St. Louis, Ill., and Mrs. Bott.
Dr. and Mrs. T. G. Beard and two daughters, Los Angeles, Calif.
Dr. and Mrs. M. W. Sullivan, Marcellus, N.Y.
Dr. Carl Norden, President, Norden Laboratories, Lincoln, Nebr., and Mrs. Norden.
Dr. Arthur D. Goldhaft, President, Vineland Poultry Laboratories, Vineland, N. J., and Mrs. Goldhaft.
Dr. and Mrs. Walter I. Dill, San Fernando, Calif.
Dr. and Mrs. Edwin Laitenen, West Hartford, Conn.
Dr. and Mrs. Carl F. Schlotthauer, Mayo Research Institute, Rochester, Minn.
Dr. T. O. Brandenburg, State Veterinarian, North Dakota, Bismarck, N.D., and Mrs. Brandenburg.
Dr. and Mrs. David Hopkins, daughter and son, Brattleboro, Vt.
Dr. and Mrs. Chester E. Williams, Butler, Okla.

Dr. and Mrs. H. H. Ross, Brandon, Manitoba, Canada.
Dr. Roberto E. Parajon, Havana, Cuba.
Dr. Maria C. Florin de Parajon, Havana, Cuba.
Dr. and Mrs. C. A. Pleuger, Cincinnati, O.
Dr. E. E. I. Hancock, Director, Animal and Poultry Services, Department of Agriculture and Marketing, Truro, Nova Scotia.
Dr. James H. Steele, Director, Veterinary Section, Communicable Diseases Division, U.S. Public Health Service, Atlanta, Ga.
Dr. Jesse Sampson, University of Illinois, College of Veterinary Medicine, Urbana, Ill.
Dr. J. D. Ray, Director of the Biological Laboratory, Corn States Serum Co. Laboratories, Omaha, Nebr.
Mrs. Frank Hecker, Houston, Tex.
Dr. Dyar C. Wood, Greensburg, Ind.
Dr. W. R. Johnson, Menomenie, Wis.
Dr. D. M. Campbell, Editor, Veterinary Medicine, Director A.V.M.A. Tour, Chicago, Ill.

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PERSONAL

Births.—Clark.—On June 14th, 1949, at the Christiana Hartley Maternity Home, Colne, Lancs., to Jean, wife of John S. Clark, a son.

Taylor.—On July 1st, 1949, at "Limecraigs," Campbelltown, Argyll, to Kathleen, wife of Ian S. M. Taylor, B.Sc., M.R.C.V.S., a daughter, Susan Kathleen.

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Mr. William Lee Weipers, M.R.C.V.S., D.V.S.M.

Director of Veterinary Education in the University of Glasgow

In our last issue we announced the appointment by Glasgow University Court of Mr. W. L. Weipers, of that city, as Director of Veterinary Education in the University from October 1st, when the Glasgow Veterinary College will be incorporated in the University. The acclaim which greeted the N.V.M.A. President's congratulatory intimation to the members at the recent Council meeting at Edinburgh is indicative of the feelings of the whole profession: veterinary education in Scotland has no more devoted enthusiast or one more popular with his fellows, all of whom wish him well in his important new sphere of responsibility.

Born in 1904, William Lee Weipers graduated M.R.C.V.S. at Glasgow in July, 1925, after which he enjoyed the advantage of an assistantship in general practice with David Imrie of Bishopbriggs. Having obtained the D.V.S.M. Edinburgh in 1927, he joined the staff of the Royal (Dick) Veterinary College (Clinical Department) under Professor Mitchell, remaining until November, 1929, when he started his own practice in Glasgow. Mr. Weipers has served on the Board of Management of the "Dick" College for five years and on the Board of Governors of the Glasgow Veterinary College for four years: he is the present Chairman of the Board. The Scottish Board of Veterinary Research has benefited from his services for the last five years and he has been a member of the U.G.C.'s Veterinary Sub-committee since it was formed.

Our readers are well acquainted, through these columns, with Mr. Weipers' many well-informed practical contributions to veterinary literature—mainly as papers to our meetings and congresses; he is, of course, providing a paper on "Clinical Aspects of Diseases of the Alimentary Tract of the Cat" at our London Congress next month.

In many other fruitful ways Mr. Weipers has evidenced the active interest he has always taken in the N.V.M.A. He has rendered valued service to the General Purposes and Finance, Parliamentary and Public Relations, Organising and Technical Development Committees of the Association, is a most helpful member of Council, and a keen "divisional" enthusiast. He was President of the West of Scotland Division for a number of years, and also was honoured by the Scottish Branch with the presidency for 1945-46.

The University School

We know, therefore, that it is under sound leadership that Glasgow University assumes responsibility for veterinary education on October 1st, when the old Glasgow Veterinary College ceases to exist. The new school will at first be administered by a Board of Studies responsible to the Faculty of Medicine and the degree will in all likelihood be a degree of Bachelor of Veterinary Medicine and Surgery, probably leading to the higher degrees of Doctor of Veterinary Medicine, or Master of Veterinary Surgery. It is expected that some students will take a B.Sc. concurrently.

At an early date it is hoped to establish a small hospital for large and small animals at Garscube Estate (two to three miles from the University). There will be a clinical centre, while a Field Station is to be built at Auchincruive in Ayrshire, the home of the West of Scotland Agricultural College and the V.I.O. centre.

Meantime some teaching will continue at the old premises at Garnethill. Some teaching will start at the University in October, but the old college buildings will have to be used for some considerable time, probably not longer than ten years.

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Mr. Jamieson's Aberdeen Doctorate.—At the Graduation Ceremonial of the University of Aberdeen held on July 7th, the Degree of Doctor of Philosophy in the Faculty of Science (Ph.D.) was conferred upon Mr. Samuel Jamieson, M.R.C.V.S., D.V.S.M., Veterinary Investigation Officer, North of Scotland College of Agriculture, Aberdeen. The title of Mr. Jamieson's thesis was "*Clostridium oedematiens* and Infectious Necrotic Hepatitis of Sheep." A further contribution to the series of studies on this subject of black disease, appearing in our columns, is made in this issue by Mr. Jamieson in conjunction with Mr. A. Thomson, of the Wellcome Research Laboratories.

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Retirement.—Lt.-Col. J. Wakefield Rainey, C.B.E., M.R.C.V.S., retired from the service with the Tasmanian Department of Agriculture on December 31st 1948, after passing the official age limit by two full years. "Still fit and keen," as Col. Rainey writes from South Africa, he is arranging to go to a district in the Orange Free State, "where a veterinarian is sorely needed and to start practice on my own with the strong moral support of our colleagues in the State service here."

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R.C.V.S. OBITUARY

Thompson, George, 30, Galgate, Barnard Castle, Co. Durham. Graduated Glasgow, December 23rd, 1896. Died March 23rd, 1949; aged 73 years.

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The I.V.C. Congress Banquet

For the information of those intending to be present at the above banquet, to be held at the Savoy Hotel, on Wednesday, August 10th, we are asked to state that while the form of dress will be optional, dinner jackets probably will be "the happy medium."

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COMMITTEE ON CRUELTY TO WILD ANIMALS

The Committee of Enquiry into Cruelty to Wild Animals held its first meeting in London on Friday, June 24th.

This Committee, which is under the chairmanship of Mr. J. Scott Henderson, K.C., was appointed by the Home Secretary and Secretary of State for Scotland to enquire into practices or activities which may involve cruelty to British wild mammals. It is not concerned with domestic or farm animals or with animals imported from abroad, but its enquiry will cover hunting, coursing, trapping and any other activities connected with wild animals whose natural habitation is in Great Britain.

Enquiries about the work of the Committee or requests to give evidence should be addressed to the Secretary at the Home Office, Whitehall, London, S.W.1.

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French Veterinary Congress

The eighth Veterinary Congress at Alfort was held June 9th to 12th inclusive, and followed a Congress of similar duration at Lyons. The Congress was under the general chairmanship of Professor Bressou, director of the Alfort Veterinary School, and was opened by the Minister of Agriculture. In addition to about 350 French veterinarians, members of the profession attended from Belgium, Holland, Italy, Switzerland and Canada. It was a disappointment to the writer to find that he was the only representative present from Britain. The programme was extremely concentrated. It differed from that of the N.V.M.A. Congresses in having no discussions after the papers, and in restricting most of the social functions to a period after the closing of the scientific proceedings. The main papers were as follows:—

"The treatment of sterility in the cow" (Professor Lesbouyries).
"Jaundice of new-born mules" (Dr. Caroli).
"Radioactive substances and their biological applications" (Professor Vuillaume).

"The modern treatment of fractures" (Professor Marcenac).
"The cryptorchid operation" (Dr. Desliens).
"The problems of livestock improvement" (Professor Letard).
"Modern therapeutics" (Professor Simonnet and Professor Brunaud).
"The chief problems facing the French National Veterinary Association" (Dr. Quentin).
"The retired veterinarian" (Dr. Saint-Cyr).
"The Army Veterinary Service and the problems of National Defence" (Commandant Bocquet).

All of these papers were extremely well attended and received, particularly that by Professor Vuillaume, who is Professor of Chemistry at Alfort and who was Congress Secretary, despite the fact that it was, of course, only of academic interest to most of the members present.

In addition to the above, the members of the Congress attended an impressive ceremony in the Maison de la Chimie in Paris to commemorate the 25th anniversary of the discovery of anatoxins by Professor Ramon. Professor Lechainche was in the chair. Numerous speeches were made congratulating Professor Ramon and telegrams from most countries of the world were read, including one from Professor Dalling. Professor Ramon, a venerable and obviously well-loved figure, replied suitably.

Other items of note at the Congress were early morning demonstrations of artificial insemination at the College farm, extensive film shows, practical demonstrations, and a large commercial exhibition.

The film shows attracted great attention. The Alfort School makes many films for teaching purposes and hence was able to present lengthy programmes of interest to all present. In addition to daily projections for two hours during the luncheon period, films were shown dealing with the following:—

"Technique of meat inspection." (Part 1, The carcase; Part 2, The lymph glands; Part 3, The organs.)
"Technique of surgical suturing."
"Ovariotomy."
"The campaign against tuberculosis in Switzerland."
"The science of milk production" (U.S.A.).
"Bovine mastitis" (British).
"Operation for cataract and transplantation of the cornea in the dog" (Danish).

The practical demonstrations ranged from complete laboratory exhibits dealing with such subjects as milk examination in all its aspects to actual operations on animals. Special attention was given to new or improved instruments, always a favourite field for continental veterinarians.

Admirable arrangements were made for luncheon, dinner and refreshments at the College, which seemed to find little difficulty in dealing with the hundreds of meals required. These were of banquet size, served with numerous wines in an atmosphere of great geniality.

Numerous sectional dinners were held by constituent parts of the French veterinary profession during the Congress, *e.g.*, by the Army veterinarians, municipal veterinarians, etc. On the final day all attended a garden party followed by a ball organised by the students of the College. The garden party featured a musical ride, a mannequin parade, thé dansant, and music hall, and the ball proceeded throughout the hours of darkness.

The commercial exhibition of drugs and instruments was on as ambitious a scale as the rest of the Congress. Sixty organisations exhibited. A special photographic feature by the Institut Français de la Fièvre Aphteuse showed the laboratories at Lyon which have recently been set up for the production of foot-and-mouth disease vaccine.

The writer had the honour of being entertained by the Director and staff of the Alfort College at a banquet at the Hotel Lutetia in Paris. This most enjoyable and cordial function was attended by Professor Guèrin, of Calmette-Guèrin fame, and by other notabilities.

The high standard of French veterinary science, despite the war and many other difficulties, is very evident. The enthusiasm of the members of the Congress throughout the longest days (from 8.30 a.m. to 7.30 p.m.) was a revelation. It is obvious that the progressive French veterinarian regards these Congresses as an annual refresher course, and equally that the teaching colleges set out to provide as wide and attractive a programme as possible. It would seem to the writer that French ideas in this respect have much to commend them.

D. D. Ogilvie.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

MEAT INSPECTION: INTER-DEPARTMENTAL COMMITTEE

Sir,—Point (V) of the supplementary notice in your issue of June 25th giving the terms of reference of the above committee reads as follows: "to consider the qualification of those at present engaged in meat inspection and the qualifications which should be required of those so engaged and the facilities for their training."

Surely this must be the outcome of some misunderstanding. The training and qualifications of the veterinary profession in the meat inspection line could hardly be "considered" by the Inter-departmental Committee.

The veterinarian's five years curriculum prepares him very carefully for one of his main diploma examinations "Meat Inspection." This subject now comprises everything connected with the pathology of animal tissues and deals in extenso with such important items as meat production, processing, livestock and carcase grading, inspection and control of food of animal origin, abattoir construction and management. No other academic profession embraces all these subjects in its training and diploma examinations.

Where "Meat Hygiene" has reached the level of present-day demands, the person concerned is the veterinary surgeon, who is also fully responsible for meat inspection, ably assisted in the practical side of this work by specially trained lay meat inspectors.

Yours faithfully,

Department of Veterinary Hygiene, Royal (Dick) Veterinary College, Edinburgh, 9. Alfred Ginsberg.

June 27th, 1949.

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PERSONNEL OF THE PROFESSION

Sir,—If Mr. Tweedale Edwards has been forcibly treated against his better judgment by "hordes of officials" let loose upon him by the National Health Service, his experience is surely unique.

It is true, of course, that the scheduled diseases are treated compulsorily both in man and animals, but as this was so before the first World War it can hardly be called a diagnostic symptom of modern "Totalitarianism," and I doubt if the wildest individualist would consider that State control of small-pox and rabies lowered our standard of living.

What I personally would like to see is a scheme whereby any farmer could obtain veterinary advice for the asking without incurring extra expense. He can now get advice on all other farming problems by means of the National Agricultural Advisory Service. Despite its inevitable teething troubles I believe this service has already helped to raise the standard of farming throughout the country, but I have heard it stated by officers of N.A.A.S. that stock husbandry is lagging behind other branches of farming because of lack of veterinary advice. I have seen "canny" farmers, who boggle at the "expense" of calling in a veterinary surgeon, trying their hardest to cadge free advice from an official of the Ministry, and I think they would certainly use a free service if there was one.

How such a service could best be arranged is a matter for discussion among ourselves and the farming community, but I believe it could be arranged, and could reduce the incidence of preventable disease materially, without any drastic curtailment of our civil liberties.

Yours faithfully,

11, Domonic Drive, New Eltham, London, S.E.9. Connie M. Ford.

June 17th, 1949.

Advertisers' Announcements

Burroughs Wellcome & Co., 183-193, Euston Road, London, N.W.1, announce that "Implantin" brand Stilboestrol Pure is now available for the chemical caponisation of cockerels. Implantation of the synthetic oestrogen results in increased weight and more tender flesh. In addition the chemical process saves time and obviates the risks of surgical caponisation. The implantation process is greatly simplified by use of the Arnold Injector. "Imp'antin" is issued as a 15 mgm. product, in tubes of 25, price 5s. (subject to professional discount), with reduced prices for quantities.

"Implantin" is supplied only to veterinary surgeons or against their prescriptions.

Stilboestrol Injector for use with "Implantin" brand stilboestrol, 25s. 6d. each, from Messrs. Arnold & Sons, 54, Wigmore Street, London, W.1.